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ENHANCING SAFETY IN FLORIDA TRANSIT SYSTEMS

Final Report

Accident Tracking Methodology/Case Study

Prepared in cooperation with the State of Florida Department of Transportation



Prepared by
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ACCIDENT TRACKING METHODOLOGY/CASE STUDY

INTRODUCTION

Under contract with the Florida Department of Transportation (FDOT), the Center for Urban Transportation Research (CUTR) was asked to evaluate and document the current State and Federal regulations regarding safety in the public transit industry. Further, this project will develop a process to help Florida transit agencies to track and analyze bus accidents. Such an analysis will help determine common causal factors contributing to accidents, in addition to potential hazards. Having a standard tracking system in place would also allow an agency to measure its success in reducing accidents over time. Having increased capabilities in tracking, analyzing, and preventing accidents can help reduce transit costs, while obviously making transit a safer and more attractive transportation alternative.

In developing system safety guidelines and accident tracking procedures, it is important to gain insight into other experiences throughout the transit industry. To this end, Technical Memorandum Number One of this project presented the results of a survey of all Florida public transit agencies, as well as selected larger systems across the U.S. and Canada. Two similar surveys were developed for this analysis. One survey, sent to the non-Florida transit systems, sought information about system safety plans as well as bus accident tracking. The Florida systems received a survey that contained only the questions related to accident tracking, as their information on system safety plans is already known.

This report presents a summary of a Case Study review of accident data at the Pinellas Suncoast Transit Authority (PSTA) in Pinellas County, Florida. Also presented is the methodology used in performing the analysis, and recommendations for data collection and analyses for tracking bus accidents by other Florida transit properties.

PSTA CASE STUDY - ACCIDENT ANALYSIS

Through the cooperation of PSTA Risk Management staff, CUTR collected and analyzed raw accident data for all 12 months of calendar year 1996. In 1996, PSTA had 234 accidents/incidents involving fixed-route buses. The terms "accidents" and "incidents" are used interchangeably and are defined by the Federal Transit Administration for the National Transit Database (NTD) as collisions, derailments, personal casualties, fires, and property damage in excess of \$1,000, associated with transit agency revenue vehicles. However, it should be noted that for the purposes of this analysis all accidents/incidents are included in the analysis regardless of value of the damage.

PSTA is an independent transit authority serving Pinellas County, Florida, with a service area of 143 square miles and a population of 792,000. According to FY 1996 NTD data, PSTA operated 6,767,000 vehicle miles of service, using 105 vehicles in maximum service. PSTA carried 7,881,000 passenger trips during this time. PSTA operates service seven days per week.

Data Analysis Methodology

One purpose of this study was to develop a simple process for the Florida transit agencies to analyze their bus accident data. While software programs exist for mainframe applications as part of a transit agency's overall computer network for accounting, operations, grants, and maintenance, this mainframe software can often be tedious and difficult to operate. Recent technological advances in microcomputers allow for easier manipulation and analysis of very large databases using readily available software. For this project, CUTR selected Microsoft Access for Windows 95, a database software package that can be used to enter, maintain, analyze, and archive a host of data including transit agency bus accident data. This software is available either as a standalone package or part of the Microsoft Office 97 bundle of software. Microsoft Access gives the end-user the ability to analyze bus accident or other data using a number of simple procedures including frequency distributions and cross-tabulations. In addition, it gives the end-user the ability to change and edit data as needed as well as archive large amounts of accident data.

The bus accident data were extracted from the 1996 PSTA Driver's Accident/Incident Reports and PSTA Supervisor Accident Reports (examples are contained in Appendix A). The data contained in PSTA's actual hard-copy bus accident reports were entered into Microsoft Access using the new/blank database (tables) feature (Appendix B). To create a new/blank database for entering bus accident data, select "File," then select "New Database." After selecting "New Database," select "OK" and then "Create" to create a new/blank database. Open the newly-created database (table) by selecting "New" and then selecting "Datasheet View" from the "New Table" window. A new/blank database (table) should now be open and ready for data entry. With the new/blank database (table) that has been created open, select "View" from the pull-down menu at the top of the screen and then select the "Design View" feature from the menu. The "Design View" feature allows for the labeling of data fields (columns) and for specifying the data type of each field (i.e., date/time, text, currency, etc.). At this point, it is best to have a "mental" layout of the desired database format. This will aid in labeling and selecting the appropriate data field types. The data fields that were specified for this project included:

- Date of accident
- Day of week
- Time of day
- Weather conditions
- Route number

- Run number
- Vehicle manufacturer
- Year of manufacture
- Number of passengers on board at time of accident
- Roadway conditions
- Accident location (nearest street intersection)
- Type of intersection
- Location of stop (nearside, far-side, mid-block)
- Type of involvement (fixed object, moving vehicle, parked vehicle)
- Type of impact dynamic (head-on, rear-end, etc.)
- Damage to transit vehicle
- Direction of bus travel
- Direction of other vehicle travel
- Number of vehicles involved
- Number of injuries
- Dollar estimate of damage to transit vehicle
- Operator hire date
- Preventable/non-preventable

After entering, labeling, and specifying data types for all of PSTA's bus accident data, a number of simple statistical procedures were performed including frequency distributions (shows the number of occurrences and associated percentages by data field, e.g., total accidents distributed among the different types of transit vehicles) and cross-tabulations (e.g., analyzing accident occurrence by vehicle type <u>and</u> vehicle manufacturer) to uncover important relationships in the data. Frequency distributions and cross-tabulations are performed by selecting "Queries" and then selecting "New." After selecting "New", several options are presented in a window labeled "New Query." From this window, select either "Simple Query Wizard" for frequency distributions or "Crosstab Query Wizard" for cross-tabulations. After making your selection, follow the prompts to perform the desired procedure (example output is contained in Appendix C).

The following sections present the frequency distributions and cross-tabulations of selected aspects of the accident data, which may be useful in analyzing the potential causes of and/or reasons for the incidents as well as in helping formulate training procedures and other strategies to decrease overall accident occurrence.

Caveat for Interpretation of Data Results

The primary purpose of this document is to report, as an example of accident tracking, the results of the analysis of the PSTA 1996 Driver's Accident/Incident Reports and the PSTA Supervisor Accident Reports. While some attempts have been made in the following sections to provide

explanatory factors for the frequency distribution results, care should be taken when interpreting the raw data and distributions. For example, when examining accident occurrence by route (see Table 5), one might simply conclude without further analysis that the greatest number of accidents occurred on Route 19. While this is true, one must continue the evaluation and examine the number of accidents per revenue mile of service to determine whether this particular route is truly problematic. In this example, Route 19 clearly has the greatest number of revenue miles operated and would therefore be expected to have the highest occurrence of accidents.

Another example, as shown in Table 7, involves the year of vehicle manufacture, where the 1994 vehicles accounted for 30.8 percent of the 1996 accidents (that had vehicle information reported for them). One may interpret this to mean that the 1994 vehicles had some problem or defect that may have contributed to the high number of accidents. However, in analyzing FY 1996 NTD data, one would find that these particular vehicles operated 30.2 percent of the system's total vehicle miles, and would therefore be expected to have produced about one-third of the system's total accidents.

FREQUENCY DISTRIBUTION ANALYSIS

Accident Occurrence by Month

In Table 1, the frequency distribution for the particular months during which the 1996 accidents occurred is presented. It is evident from the distribution that three months in particular stand out for accident occurrence: September (12.8 percent), November (12.8 percent), and May (11.1 percent). It is interesting to note that two of the three months, May and September, approximately coincide with the ending and beginning of the school year. Typically, these months are characterized by higher traffic volumes and congestion--school buses are added to the mix as well as additional vehicles on the road due to parents having to drop off school-age children. The marked changes in traffic patterns and volumes that occur between the times when school is in session and when it is out of session often can create a more fertile environment for accident occurrence because of driver impatience and confusion. Later in this document, this particular factor will be further analyzed using cross-tabulations.

Table 1
Frequency Distribution for Month Accident Occurred

Month in Calendar Year 1996	Frequency	Percent Distribution
January	17	7.3
February	17	7.3
March	14	6.0
April	14	6.0
May	26	11.1
June	16	6.8
July	22	9.4
August	14	6.0
September	30	12.8
October	15	6.4
November	30	12.8
December	19	8.1
Total	234	1,00.0

Accident Occurrence by Day of Week

Table 2 shows the frequency distribution for the days of the week during which the 1996 accidents occurred. The two days during which the most accidents occurred are Tuesday and Thursday. Tuesday through Thursday are typically the busiest travel days of the week--days during which the most traffic is on the roads. The next most frequent day for accident occurrence is Friday.

Table 2
Frequency Distribution for Day of Week Accident Occurred

Day of Week	Frequency	Percent Distribution
Monday	29	12.4
Tuesday	46	19.7
Wednesday	32	13.7
Thursday	45	19.2
Friday	41	17.5
Saturday	25	10.7
Sunday	16	6.8
Total	234	100.0

Accident Occurrence by Time of Day

Table 3 presents the frequency distribution for the various times of the day that the 1996 accidents occurred. The time periods during which the most accidents occurred are 2:00-2:59 p.m. (9.8 percent of accidents with reported occurrence times) and 3:00-3:59 p.m. (9.8 percent). Approximately one-fifth of all the accidents that had reported occurrence times took place during this two-hour period. While it does not coincide with the actual afternoon peak period typically associated with most urbanized areas (i.e., 4:00-6:00 p.m.), due to the more elderly population of Pinellas County, this two-hour period is most likely the time during which elderly drivers make shopping, medical, and other personal trips. The next highest accident occurrence time periods are 5:00-5:59 p.m. (8.1 percent), 8:00-8:59 a.m. (7.7 percent), and 4:00-4:59 p.m. (7.3 percent), which all fall within the more typical morning and afternoon peak travel times.

Table 3
Frequency Distribution for Time of Day Accident Occurred

Time of Day	Frequency	Percent Distribution
6 to 6:59 AM	7	3.0
7 to 7:59 AM	12	5.1
8 to 8:59 AM	18	7.7
9 to 9:59 AM	12	5.1
10 to 10:59 AM	15	6.4
11 to 11:59 AM	16	6.8
12 to 12:59 PM	. 16	6.8
1 to 1:59 PM	11	4.7
2 to 2:59 PM	23	9.8
3 to 3:59 PM	23	9.8
4 to 4:59 PM	17	7.3
5 to 5:59 PM	19	8.1
6 to 6:59 PM	10	4.3
7 to 7:59 PM	8	3.4
8 to 8:59 PM	5	2.1
9 to 9:59 PM	1	.4
10 to 10:59 PM	3	1.3
11 to 11:59 PM	3	1.3
Subtotal	219	93.6
Missing	15	6.4
Total	234	100.0

Accident Occurrence by Type of Weather

The frequency distribution for the weather conditions that existed at the time of the 1996 accidents is contained in Table 4. The vast majority of the accidents for which weather conditions were reported occurred on clear days (65.4 percent). Only 5.6 percent and 1.3 percent of the accidents occurred on rainy days or in darkness, respectively. More than one-fourth of all the 1996 accidents did not have weather conditions recorded on their accident/incident report forms.

Table 4
Frequency Distribution for Type of Weather When Accident Occurred

Weather	Frequency	Percent Distribution
Clear	153	65.4
Fog	1	.4
Rain	13	5.6
Dark	3	1.3
Subtotal	170	72.6
Missing	64	27.4
Total	234	100.0

Accident Occurrence by Route

The frequency distribution for the routes on which the 1996 accidents occurred is presented in Table 5. The two routes with the most accident occurrences are Route 18 (12.0 percent of accidents with reported routes) and Route 19 (10.3 percent). These are two of the longest routes in the system, traversing nearly the entire county, and operating a significant amount of revenue miles. Both routes also operate primarily along heavily-traveled urban roadways: Route 19 operates along U.S. 19 and Route 18 operates along Tyrone Boulevard, Seminole Boulevard, and Missouri Avenue.

Table 5
Frequency Distribution for Route Where Accident Occurred

Route	Frequency	Percent Distribution
3.00	1	.4
4.00	15	6.4
5.00	6	2.6
7.00	4	1.7
9.00	3	1.3
10.00	1	.4
11.00	3	1.3
14.00	3	1.3
15.00	4	1.7
16.00	3	1.3
18.00	28	12.0
19.00	24	10.3
20.00	3	1.3
22.00	3	1.3
23.00	8	3.4
27.00	1	.4
29.00	2	.9
30.00	1	.4
35.00	4	1.7
38.00	1	.4
44.00	1	.4
52.00	20	8.5
59.00	12	5.1
60.00	2	.9
61.00	4	1.7
63.00	2	.9
66.00	8	3.4
67.00	3	1.3
71.00	4	1.7
73.00	2	.9
74.00	7	3.0
75.00	2	.9
76.00	4	1.7
78.00	1	.4
79.00	7	3.0
80.00	5	2.1
82.00	3	1.3
94.00	3	1.3
97.00	3	1.3
100.00	3	1.3
Subtotal	214	91.5
Missing	20	8.5
Total	234	100.0

Accident Occurrence by Transit Vehicle Type

Table 6 contains the frequency distribution for the various types of transit vehicles that were involved in the 1996 accidents. The vehicle types with the most accident occurrences are the Gillig vehicles (34.6 percent of the accidents with reported vehicle types) and the Flxible vehicles (31.6 percent). These two vehicle types also happened to comprise the majority of PSTA's vehicle fleet during the 1996 fiscal year: Gillig vehicles made up about 31 percent of the fleet while Flxible vehicles made up about 38 percent of the fleet. Additionally, 19.2 percent of the accidents involved GMC transit vehicles; in 1996 these vehicles comprised 23 percent of PSTA's vehicle fleet.

Table 6
Frequency Distribution for Types of Transit Vehicles Involved in Accidents

Vehicle Type	Frequency	Percent Distribution
Flxible	74	31.6
GMC (van)	1	.4
Gillig	81	34.6
GMC	45	19.2
Orion	12	5.1
Ford	1	.4
Dodge	1	.4
International	1	.4
Jeep	2	.9
New Flyer	. 7	3.0
Subtotal	225	96.2
Missing	9	3.8
Total	234	100.0

Accident Occurrence by Transit Vehicle Year of Manufacture

Table 7 presents the frequency distribution for the years of manufacture of the transit vehicles that were involved in the 1996 accidents. The vehicle years of manufacture with the most accident occurrences are the 1994 vehicles (30.8 percent of the accidents with reported vehicle years of manufacture) and the 1993 vehicles (17.5 percent). As was the case for vehicle type, these particular years represent the most vehicles in PSTA's inventory during the 1996 fiscal year, according to NTD data.

Table 7
Frequency Distribution for Year of Manufacture of Transit Vehicles Involved in Accidents

Vehicle Year of Manufacture	Frequency	Percent Distribution
1980	14	6.0
1982	25	10.7
1983	20	8.5
1985	9	3.8
1986	1	.4
1989	10	4.3
1991	7	3.0
1992	16	6.8
1993	41	17.5
1994	72	30.8
1995	3	1.3
1996	6	2.6
1997	1	.4
Subtotal	225	96.2
Missing	9	3.8
Total	234	100.0

Accident Occurrence by Roadway Condition

In Table 8, the frequency distribution for the conditions of the roadway(s) on which the 1996 accidents occurred is shown. For the most part, accidents occurred on roadways without any reported defects (62.8 percent of accidents with reported roadway defects). Only 3.8 percent and 3.0 percent of the accidents occurred on roadways under repair or on slippery roadways, respectively. In addition, 29.1 percent of all the 1996 accidents did not have roadway conditions recorded on their accident/incident report forms.

Table 8
Frequency Distribution for Condition of Roadway on which Accident Occurred

Roadway Conditions	Frequency	Percent Distribution
No Defects	147	62.8
Slippery	7	3.0
Under Repair	9	3.8
Cracked Sidewalk	1	.4
Muddy	1	.4
Holes or Ruts	1	.4
Subtotal	166	70.9
Missing	68	29.1
Total	234	100.0

Accident Occurrence by Type of Involvement

The frequency distribution for the type of involvement for the 1996 accidents is presented in Table 9. As evidenced in the table, the majority of these accidents involved a motor vehicle (59.8 percent of the accidents with a reported type of involvement). The next highest incident type involved passengers on the bus (19.2 percent). These particular incidents include passengers falling or tripping while boarding/alighting the bus or walking down the aisle or passengers falling out of their seats (or wheelchairs) during a quick or hard braking of the bus, among other occurrences.

Table 9 Frequency Distribution for Type of Involvement

Type of Involvement	Frequency	Percent Distribution
Fixed Object	32	13.7
Motor Vehicle	140	59.8
Parked Vehicle	2	.9
Passenger on Bus	45	19.2
Projectile	6	2.6
Pedestrian	1	.4
Another PSTA Vehicle	2	.9
Bicycle	1	.4
Subtotal	229	97.9
Missing	5	2.1
Total	234	100.0

Accident Occurrence by Impact Dynamics

The frequency distribution for the particular dynamics of the impacts of the 1996 accidents is presented in Table 10. The data in the table indicate that non-collisions (33.8 percent of the accidents with a reported impact dynamic) had the highest frequency of occurrence. Non-collisions include passenger injuries caused by sudden vehicle stops/starts and swerves, as well as non-vehicle accidents where a bus may hit a tree or curb. The second most frequent dynamic of impact was side swipe (30.3 percent) where a bus was hit on the side (other than a right angle hit) or the bus hit an object with its side.

Table 10
Frequency Distribution for Occurrence Impact Dynamics

Impact Dynamics	Frequency	Percent Distribution
Head On	4	1.7
Right Angle	. 26	11.1
Rear End	47	20.1
Side Swipe	71	30.3
Non-Collision	79	, 33.8
PSTA Hit	2	.9
Subtotal	229	97.9
Missing	5	2.1
Total	234	100.0

Accident Occurrence by Identified Preventability Status

The frequency distribution for the preventability status (i.e., whether an accident is preventable or non-preventable) of the 1996 accidents is presented in Table 11. As shown in the table, 78.2 percent of the PSTA accidents that occurred in 1996 were classified as non-preventable by the system.

Table 11
Frequency Distribution for Identified Preventability Status of Accidents

Preventability Status	Frequency	Percent Distribution
Non-Preventable	183	78.2
Preventable	51	21.8
Total	234	100.0

Accident Occurrence By Years of Operator Experience

The frequency distribution for operator experience at the time of each 1996 accident is shown in Table 12. The data in the table indicate that, contrary to logical thinking, the majority of accidents occurred with more senior experienced operators (10 or more years - 42.7 percent, 7 to 9 years - 15.8 percent). However, this table also presents the distribution of years of experience for all of PSTA's operators. This can be used as a proxy for operator exposure (i.e., total vehicle hours operated by a driver). When using these additional data, it appears that accidents are directly related to the amount of operating exposure, except in the instance of operators with 1 to 2 years of experience, where it appears that they are experiencing a higher rate of accidents in comparison to their operating exposure. Nevertheless, a more detailed analysis would be to look at the driver vehicle hours of operation by years of experience in relationship to the number of accidents, which may very well show that the senior drivers operate an even higher percentage of total vehicle hours than the percentage shown for operator distribution by years of experience.

Table 12
Frequency Distribution for Operators' Experience

Years of Experience at PSTA	Frequency	Percent Distribution	Operator Distribution
Less than 1 Year	12	5.1	6.3
1 to 2 Years	22	9.4	7.0
3 to 4 Years	33	14.1	13.3
5 to 6 Years	25	10.7	9.0
7 to 9 Years	37	15.8	18.0
10 or More Years	100	42.7	46.5
System Missing	5	2.1	NA
Total	234	100.0	100.0

Summary of Frequency Distribution Findings

A review of the frequency distributions for selected characteristics from PSTA's 1996 accident database determined that a "typical" accident during this particular year occurred:

- during the months of September and November;
- on a Tuesday or a Thursday;
- between the hours of 2:00-3:59 p.m.;
- under clear weather conditions
- on Route 18;
- on-board or involving a 1994 Gillig motorbus;

- on a roadway with no defects;
- as a non-collision impact dynamic;
- as a non-preventable accident; and
- involving an operator with 10 or more years of experience.

For the most part, the frequency analysis alone did not reveal any significant unexpected issues or causal factors which PSTA would need to address through maintenance actions and/or training/re-training. However, some issues were identified with the both the level of detail and the "completeness" of the data collected by PSTA. First, the vast majority of the accident occurrence characteristics had missing data. For example, both the weather condition and roadway condition factors had over 25 percent missing data. While much of the missing data may not be critically important to deal with fault determination and related insurance claims, ensuring the completeness of the data is of utmost importance when performing a detailed analysis of the system's accident occurrence data for purposes of improving maintenance and/or training programs. Further, in addition to ensuring data completeness, an accident tracking analysis could also benefit from additional occurrence factors such as specific roadway characteristics (i.e., posted roadway speed, number of lanes, etc.) as well as perhaps greater detail within some of the characteristics.

It should also be noted that, while still beneficial, this analysis of PSTA accident data only considered one year's worth of data. Additional benefit can be derived if current year occurrence information is compared to that for previous years in order to analyze the success of any accident prevention actions and/or training programs that have been instituted over those years.

CROSS-TABULATION ANALYSIS OF PERTINENT DATA

Analysis of frequencies alone can provide useful information on the individual characteristics of each accident. However, some characteristics are better analyzed in relation to other factors to gain a more complete understanding of their influence on accident occurrence. For example, it may be interesting to know the distribution of accidents by the year of vehicle manufacture, or separately by the manufacturer of the transit vehicle involved in each accident. However, it is most beneficial to examine the accidents by both of these factors at the same time (i.e., a crosstabulation) so a transit system can better gauge which particular vehicles in their fleet, by year and manufacturer, may have the highest incidence of accidents and, as a result, may lead to detailed analyses of the most problematic vehicles. The results of these further analyses would then enable the system to develop more and/or different training procedures and maintenance techniques.

The following sections discuss the results of a number of cross-tabulations that were completed on PSTA's accident data. These particular cross-tabs were selected to provide a more detailed analysis of the causal factors of the accidents experienced by PSTA during the 1996 calendar year.

Type of Occurrence by Route

Table 13 presents a cross-tabulation of type of occurrence by route for those routes that had five or more occurrences of a particular type of accident. A total of six routes had five or more accidents within an occurrence type. For example, as highlighted in the table, Route 18 had a total of 28 accidents during 1996. Thirty-six percent (10 accidents) of these were non-collision incidents, 32 percent (9) were sideswipe accidents, and 18 percent (5) were right angle accidents. For certain accident types, this information can be utilized to further examine specific routes for potential causal factors such as road geometry, signage/signalization, bus stop spacing/location, etc.

Table 13
Cross-Tabulation for Type of Occurrence by Selected Routes

D	Type of Occurrence									
Route Number	Head On	Right Angle	Rear End	Side Swipe	Non- Collision	PSTA Hit	Total			
4	1	2	0	2	9	0	14			
18	0	5	4	9	10	0	28			
19	0	1	9	9	5	0	24			
23	0	0	1	2	5	0	8			
52	0	2	5	7	6	0	20			
59	0	2	6	1	2	0	11			

Type of Occurrence by Preventability

A cross-tabulation of type of occurrence by the preventability of the occurrence is shown in Table 14. One of the least frequently occurring accident types during 1996 was the head-on collision. However, the cross-tab data in the table below indicate that three-quarters of the accidents of this particular type were preventable. Another type of accident with a high percentage of preventable occurrences was the sideswipe, where 27 percent of the total accidents of this type were preventable. Overall, in 1996, a total of 21 percent of PSTA's occurrences were classified as being preventable.

Table 14
Cross-Tabulation for Type of Occurrence by Preventability

		Type of Occurrence						
Preventability	Head Right Rear Side Non- PSTA On Angle End Swipe Collision Hit						Total	
Preventable	3	3	3	19	19	1	48	
Non-Preventable	1	23	44	52	60	1	181	

Years of Operator Experience by Preventability

The results for the cross-tabulation of years of operator experience by occurrence preventability is shown in Table 15. The group with the lowest percentage of preventable accidents is drivers with less than one year of experience. Less than 17 percent of the twelve accidents this group had were preventable, which may be attributable to their recent training and "freshman" cautiousness. On the other hand, operators with one to two years of experience had the second greatest percentage (32 percent) of preventable accidents. This may suggest that these drivers have become more cavalier in their driving habits as they have gained some experience. Finally, as would be expected, the drivers with the most experience (i.e., 10 or more years) accounted for the second lowest percentage of preventable accidents.

Table 15
Cross-Tabulation for Years of Operator Experience by Preventability

	Years of Operator Experience							
Preventability	< 1 year	1-2 years	3-4 years	5-6 years	7-9 years	10+ years	Total	
Preventable	2	7	7	8	8	19	51	
Non-Preventable	10	15	26	17	29	81	178	

Years of Operator Experience by Type of Occurrence

Table 16 includes the results for the cross-tabulation of years of operator experience by the type of occurrence. From the data, it is apparent that the least-experienced (i.e., less than one year of experience) drivers are having difficulties with sideswipe accidents, in that 58 percent of their accidents were of this particular type. The only other type of occurrence that is significant within a particular driver-experience group is the non-collision occurrence. More than 42 percent of the accidents attributed to the drivers with 3 to 4 years of experience were of this type. Interestingly,

though there were very few head-on collision accidents in 1996 (four), 75 percent of these accidents occurred within the driver group with 10 or more years of experience.

Table 16
Cross-Tabulation for Years of Operator Experience by Type of Occurrence

V	Type of Occurrence							
Years of Operator Experience	Head On	Right Angle	Rear End	Side Swipe	Non- Collision	PSTA Hit		
< 1 year	0	1	2	7	2	0		
1-2 years	1	2	6	6	6	0		
3-4 years	0	3	7	9	14	0		
5-6 years	0	1	6	8	7	2		
7-9 years	0	9	5	11	11	0		
10+ years	3	. 9	21	29	36	0		
Total	4	25	47	70	76	2		

Vehicle Manufacturer by Year of Manufacture

A cross-tabulation of PSTA's types of transit vehicles (by manufacturer) by the years of manufacture for the vehicles was completed to determine whether any high levels of accident occurrence were associated with any particular segment of PSTA's fleet. Table 17 illustrates the results from this analysis for only PSTA's motorbus vehicles (i.e., no vans or supervisor vehicles) that were in operation during the 1996 fiscal year. This allows for the further comparison of accident occurrence with vehicle exposure as measured by FY 1996 NTD vehicle inventory data on "Total Miles on Active Vehicle During Period."

As shown in Table 17, of PSTA's 212 motorbus vehicle accidents that had both vehicle year and model information available, more than 33 percent involved a 1994 Gillig bus. Additionally, another 19 percent of these accidents involved a 1993 Flxible bus. These figures may lead one to believe that PSTA's 1993 Flxible and 1994 Gillig motorbus vehicles had some problem(s) or defect(s) that may have contributed to the high accident occurrence rates for these vehicles. However, a review of FY 1996 NTD vehicle exposure data shows that the 1993 Flxible and 1994 Gillig vehicles operated 21.2 percent and 30.3 percent of the system's total vehicle miles, respectively, and together would therefore be expected to have produced about one-half of the total motorbus accidents.

Table 17
Cross-Tabulation for Vehicle Manufacturer by Year of Manufacture

Year of	Vehicle Manufacturer							
Manufacture	Flxible	Gillig	GMC	Orion	· Total			
1980	0	0	14	0	14			
1982	0	0	24	0	24			
1983	14	0	6	0	20			
1985	8	0	0	0	8			
1986	1	0	0	0	1			
1989	9	0	0	0	9			
1991	0	7	0	0	7			
1992	0	2	0	12	14			
1993	41	0	0	0	41			
1994	1	71	0	0	72			
1995	0	1	1	0	2			
Total	74	81	45	12	212			

Summary of Cross-Tabulation Findings

Since the cross-tabs were completed only on selected data to gain a better understanding of the relationships between certain characteristics, it is difficult to draw significant conclusions on the entire accident database based on these analyses. However, the following observations were made based on the cross-tabulations that were examined.

- Routes 18 and 19 had the greatest incidence of sideswipe occurrences, with nine accidents each during 1996.
- Seventy-five percent of the head-on accidents that occurred in 1996 were preventable.
- Operators with 1-2 and 5-6 years of experience had the highest percentage (approximately 32 percent) of preventable accidents, among all drivers.
- Fifty-eight percent of the accidents attributed to drivers with less than one year of experience were sideswipe occurrences.

 The number of accident occurrences by vehicle type/year of manufacture corresponded to each vehicle type/year's exposure (i.e., total miles of service in 1996).

GEOGRAPHIC ANALYSIS OF ACCIDENT OCCURRENCE

Using MapInfo, a Geographic Information System (GIS) mapping software program for microcomputers, the location of each of the accidents with available data was plotted to help determine high accident occurrence locations. MapInfo is a Windows-based, comprehensive desktop tool that allows users to create and customize maps. Beyond the basic map design capabilities, it can also process database queries and import Microsoft Excel files. Thus, the type of data easily manipulated and displayed in MapInfo is unlimited. One database that is commonly utilized with MapInfo by government and planning agencies is the Bureau of the Census data. While such mapping software facilitates the geographic analysis of accident data, transit agencies that do not have MapInfo or a similar GIS mapping package (e.g., ArcVIEW) should enlist the assistance of any local government agencies that have such software (e.g., MPOs, RPCs, etc.) or should map their accident data manually. Currently, a complete copy of MapInfo Version 5.0 retails for approximately \$1,300, although some government discounts may be available.

The plotted data is illustrated in Figures 1 through 3, shown on the following three pages. Figure 1 displays the number of accidents by location for all of Pinellas County, while Figures 2 and 3 display the same information for the northern and southern halves of the county, respectively, in order to present the data with a higher level of geographic detail. It should be noted that, for purposes of these figures, only 215 of PSTA's total 234 accidents in 1996 had sufficient locational information to allow for plotting.

In order to summarize accident location similarities, accidents that occurred within 300 feet of a center point were combined as one location. Therefore, for those locations with more than one accident, the actual occurrences may not be exactly at the same intersection or geographic reference point, but occurred within 300 feet of one another. This 300-foot grouping of accident locations, while not precise, is still at a level of detail that will identify those sites of concern that should be analyzed for possible contributory characteristics.

Figure 1
1996 PSTA Accidents

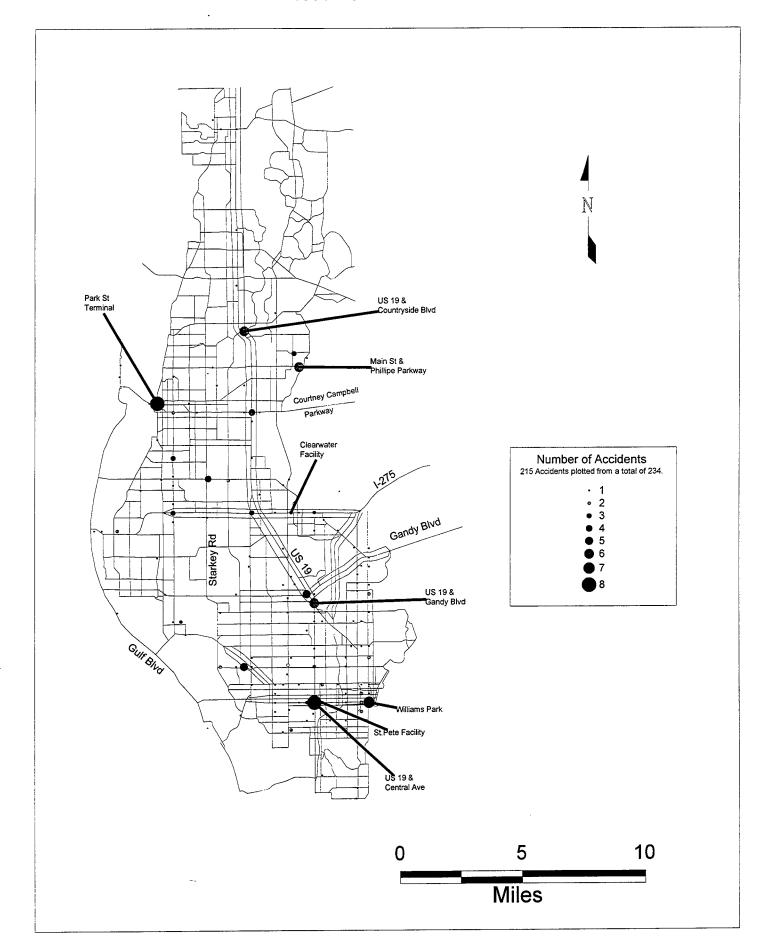


Figure 2 North Portion of Pinellas County



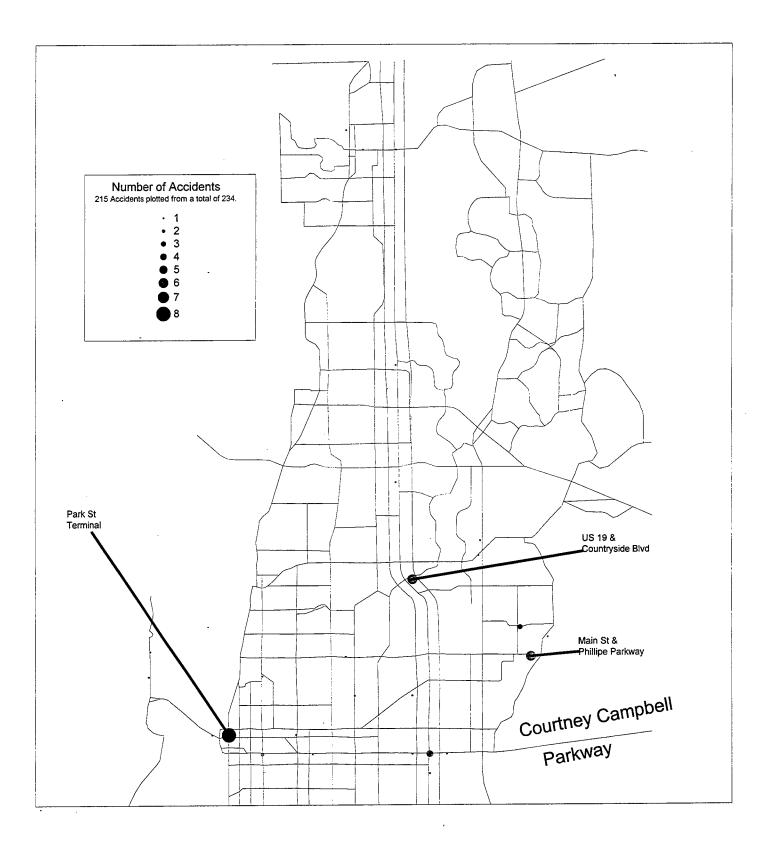
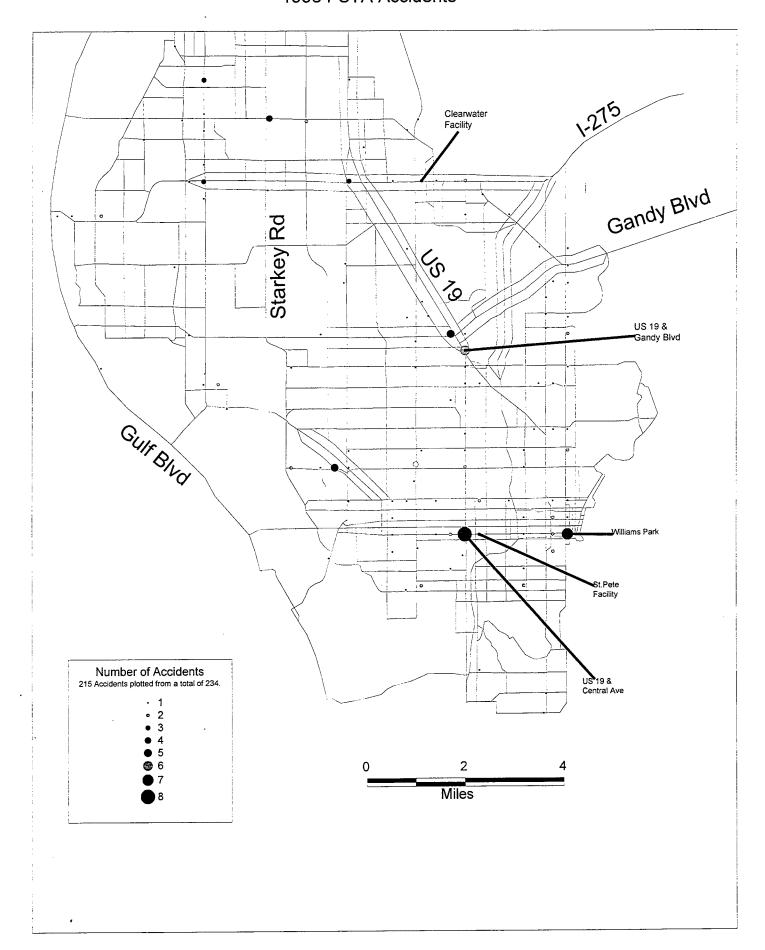


Figure 3
South Portion of Pinellas County
1996 PSTA Accidents



Frequency Analysis of Accident Location Data

As can be seen in the three figures, the majority of the accidents with locational information occurred in the southern portion of Pinellas County, specifically in the areas to the west and north of Downtown St. Petersburg. According to the key on each of the figures, accident locations are noted by different sized and colored circular symbols that reference the number of accidents at the locations (from 1 to 8 accidents). Those areas where six or more of the 1996 accidents occurred are labeled on the figures and are as follows:

- Main St. and Philippe Pkwy. (6 accidents)
- U.S. 19 and Countryside Blvd. (6 accidents)
- U.S. 19 and Gandy Blvd. (6 accidents)
- Williams Park (7 accidents)
- Park St. Terminal (8 accidents)
- U.S. 19 and Central Ave. (8 accidents)

Cross-Tabulation Analysis of Accident Location Data

The six areas with the greatest number of accident occurrences (i.e., six or more accidents) were further analyzed by performing cross-tabulations on location by all other occurrence characteristics. Following are the characteristics of note, if any, that were identified for the six high accident occurrence locations.

- Five of the eight (approximately 63 percent) accidents occurring at or near
 the intersection of U.S. 19 and Central Ave. were sideswipes. Frequency
 data for all of PSTA's accidents showed that sideswipes accounted for only
 30 percent of accident impact dynamics.
- Similarly, four of seven (57 percent) accidents at or near Williams Park were sideswipes.
- Four of the eight (50 percent) accidents occurring at or near the Park St. terminal were preventable accidents, with three of the four being sideswipes.
 Frequency data for all of PSTA's accidents showed that only 22 percent of the accidents were preventable.
- Similarly, three of the six (50 percent) accidents occurring at or near the intersection of Main St. and Philippe Pkwy. were non-preventable accidents.

RECOMMENDATIONS

Based on the information collected in the survey of transit system operators related to system safety plans and accident tracking procedures, as well as the collection and analysis of PSTA's 1996 accident occurrence data, CUTR has identified five steps that should be followed by all of the Florida public transit systems when analyzing accident occurrence data and developing corrective action plans for addressing identified problem areas. The five steps are as follows:

- 1. Collection of the data
- 2. Preparation of the data for analysis
- 3. Analysis of the data
- 4. Interpretation of the results
- 5. Action plan to deal with identified issues/problems

The following sections outline CUTR's specific recommendations as they pertain to each of the five steps.

Data Collection

The first step involves the actual collection of accident occurrence data. As stated previously, while many accident occurrence characteristics must be collected for fault determination and related insurance claims, there is a core set of characteristics that are fundamental in analyzing a system's accident occurrence data for purposes of improving maintenance and/or training programs. It is recommended that the FDOT request that all of the Florida public transit systems collect the core set of accident occurrence characteristics that is detailed below. This will allow for not only similar analyses and comparisons between systems, but also for a comprehensive analysis of accident occurrence throughout the State.

- Date, day of week, and time of day of occurrence
- Specific location of occurrence (intersection, cross street, plaza, mall, other key location)
- Location of stop (near-side, far-side, mid-block)
- Roadway surface type (concrete, asphalt, brick, gravel)
- Roadway geometry (number of lanes, configuration, posted speed, traffic control)
- Roadway conditions (wet, dry, under repair, holes/ruts, muddy, no defects)
- Weather conditions (clear, cloudy, raining, foggy, other)
- Light conditions (daylight, glare, dawn, dusk, dark w/streetlights on, dark w/streetlights off, dark w/no streetlights)
- Traffic conditions (light, moderate, or heavy)

- Route number
- Vehicle type, manufacturer, and year of manufacture
- Observed vehicle defects prior to or at time of accident (steps, floors, seats, brakes, lights) and date of last scheduled preventative maintenance
- Operator hire date (to be used to calculate years of experience at time of occurrence)
- Operator status (regular operator, regular relief, vacation relief, mini-run, extra board, mechanic, supervisor, service attendant)
- Date of operator's last refresher training course
- Occurrence impact dynamic (head on, sideswipe, right angle, rear end, non-collision, bus hit other, bus was hit, other)
- Type of involvement (fixed object, moving vehicle, parked vehicle, pedestrian, cyclist, projectile)
- Transit vehicle movement prior to/at time of occurrence (going straight, turning left, turning right, pulling into curb or loading zone, pulling away from curb or loading zone, passing, being passed, changing lanes, merging, sudden stop, slowing/braking, stopped in traffic lane, stopped in loading zone, parked, backing, starting, other)
- Movement(s) of other vehicle(s) involved prior to/at time of occurrence (going straight, turning left, turning right, pulling into curb or loading zone, pulling away from curb or loading zone, passing, being passed, changing lanes, sudden stop, slowing/braking, stopped in traffic lane, stopped in loading zone, parked, backing, starting, other)
- Pedestrian/cyclist movement prior to/at time of occurrence (walking/ running/riding with traffic, walking/running/riding against traffic, stationary, working in roadway, playing in roadway, unknown, other)
- Pedestrian/cyclist action related to location of occurrence
 - At intersection (in crosswalk, not in crosswalk, no crosswalk, with sign/ signal, against sign/signal, no sign/signal)
 - Not at intersection (crossing diagonally, crossing in front of vehicle, crossing from behind vehicle, getting in/out of other vehicle, crossing from between parked cars, other)
- Passenger movement prior to/at time of occurrence (waiting, boarding, alighting, standing in vehicle, moving in vehicle, sitting in vehicle, on lift, other)
- Observed condition of other driver/pedestrian/cyclist/passenger (influenced by alcohol/intoxicated, sober, sleepy/fatigued, infirmed, wearing glasses, carrying objects, with an observable disability, no observable disability, other)
- Contributory factors (vehicle double-parked, vehicle in crosswalk, pedestrian jaywalking, vehicle pulled out in front, vehicle parked at angle, vehicle parked in zone, other)

- Evasive action(s) taken by driver (hard braking, swerve, other)
- Preventability status of occurrence

It is extremely important to note once again that the previous items are recommended for individual system and statewide accident tracking analyses only. Although other occurrence-related information necessary for liability and/or insurance claim purposes is not specifically accounted for in the recommended "core set" of occurrence characteristics, it is up to the individual properties to include specific questions and/or sections on their accident/incident reports to collect this information. From the data that were collected as part of the survey portion of this project, one system--Tri-Met in Portland, Oregon--provided an excellent example of a set of accident/incident reporting forms that can serve as a useful model for accident data collection at the Florida properties. These forms are provided in Appendix D.

Further, it is also important to mention that any analysis is only as good as the data on which it is based. As such, it is very important to stress that all operators and supervisors complete all accident/incident report forms to the best of their ability. To ensure this, it is recommended that all operators and supervisors be trained on how to properly fill out the reports.

Data Preparation

The second step involves the input of the accident occurrence data into a format that can be readily analyzed for both frequency distributions and cross-tabulations. For example, the PSTA Case Study presented in this document utilized Microsoft Excel to create the initial database spreadsheet and Microsoft Access to analyze the data. Other software that can be used for these purposes include Lotus 1-2-3, Statistical Package for the Social Sciences (SPSS), or the SAS System statistical software package, among others. Once the data have been entered into an accident database, all efforts should be made to fill in missing data and ensure that all data have been entered correctly. In some cases, additional calculations may need to be made. For example, driver years of experience will need to be calculated using the operator hire dates.

Data Analysis

The third step of the process is to analyze the accident/incident database that has been developed. While systems should continually collect and monitor their accident occurrence data, the detailed analysis of the data should be undertaken on an annual basis. The analyses can be made using any of the software that was discussed in the previous section. Although the PSTA Case Study utilized Microsoft Excel and Access, the statistical software packages (e.g., SAS, SPSS) actually are more powerful analytical tools; however, they are more expensive options and also require greater user familiarity with the software capabilities and, in some cases, programming experience.

The first stage in the analysis process is to run frequency distributions on all of the data fields in the accident/incident database. A frequency distribution shows the number of occurrences and associated percentages for a data field. A frequency distribution, by itself, allows the analyst to identify the dominant accident characteristics, as well as those that may be unexpected or contrary to the "norm." From this type of analysis, alone, areas requiring corrective actions can be identified. However, there will be instances when a frequency will not pinpoint the causality behind an area of concern. Sometimes, a frequency analysis will identify a potential problem that really is not a concern when other information is considered. For example, in the PSTA Case Study, about 32 percent of the system's 1996 accidents occurred to/on a Gillig motorbus, the greatest percent occurrence among PSTA's vehicle manufacturers. Further analysis of PSTA's FY 1996 NTD data showed that 34 percent of the system's total vehicle miles were accumulated on these vehicles, thereby showing a slightly smaller level of accident involvement for these vehicles in comparison to their exposure.

In those cases when the frequency analysis does not provide enough insight into or cannot pinpoint the actual causal factors of a potential problem, it can be beneficial to undertake additional cross-tabulation analyses. The second stage of the analytical process, a cross-tabulation shows the number of occurrences and associated percentages for multiple data fields at the same time and can uncover important relationships between these data fields. For example, the frequency distribution of occurrence impact dynamics for PSTA's 1996 accidents showed that sideswipes encompassed the second highest (30 percent) type of impact. While important, this alone does not give a clear picture of the specific attributes of this particular type of impact. However, further information was gained by cross-tabulating impact dynamics by the operators' years of experience. This cross-tabulation determined that 58 percent of the sideswipe accidents could be attributed to drivers with less than one year of experience. This additional information can greatly assist PSTA in targeting training/re-training for lowering the incidence of this accident impact dynamic.

One note of caution is that not all data fields are related. To save time and effort, it is recommended that any cross-tabulation analysis be somewhat limited in scope--do not cross-tabulate every data field by every other data field. Conducting the frequency distribution analysis first can help direct which cross-tabulations should be completed.

Finally, the third stage of the analytical process is to geocode accident locations and review all occurrences geographically. As mentioned previously, MapInfo and ArcVIEW are two GIS packages that can be used for this type of analysis. Specifically, a geographic analysis would help identify those sites that have geometric design, signalization, or other characteristics that may make them more conducive to accident occurrence.

Data Interpretation

The fourth step of the process is to review all of the completed data analyses and attempt to interpret their results. As has been cautioned several times throughout this document, care must be taken when interpreting the raw data and the frequency distribution and cross-tabulation analyses. For example, a system may find that the vast majority of its accidents occurred on days with clear weather. Because of this, system analysts may ignore the impact of weather conditions on any subsequent analyses. However, it may have been the case that the service area experienced clear weather on the vast majority of its service days, so it would only make sense that clear conditions prevailed for the majority of the accidents. It may prove to be more diagnostic if the system would cross-tabulate weather conditions by accident impact dynamic and only analyze accidents that occurred on rainy days to see if a particular impact type occurred more frequently in inclement weather.

Action Plan

The fifth, and final, step of this process is to take corrective measures to deal with the identified areas of concern. Corrective actions that may result from the analyses may include:

- Training/re-training;
- Preventative maintenance;
- Vehicle specifications;
- Route alignment/modification;
- Roadway geometric/signalization improvements; and
- Passenger safety education.

Once systems have collected accident occurrence data for multiple years, identified accident data trends can be analyzed to determine the level of success of any corrective actions that have been undertaken during that time. If all of the Florida public transit systems begin to collect the core set of accident occurrence data recommended previously (along with any other data that they may need for insurance/liability purposes), then the data can be analyzed and compared across all systems as well as for the state as a whole. In addition, once the Florida properties have multiple years' worth of accident data, they will also be able to begin sharing the results of their respective system-level corrective actions implemented over time.

Appendix A

PSTA 1996 Driver's Accident/Incident Report and PSTA Supervisor Accident Report Forms

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Appendix B

1996 PSTA Raw Accident Data In Excel Table

PSTA Accident Tracking

2		12/12/94	10/26/90	03/15/89	09/19/83	04/24/84	10/27/76	08/15/83	11/14/88	07/17/89	10/15/93	01/10/94	06/20/94	04/01/85	02/26/86	08/14/89	03/24/87	01/11/84	12/12/94	10/14/85	12/01/82	05/27/86	04/09/79	12/06/91	11/20/92	04/20/89	01/18/82	08/11/80	03/07/94	04/30/90	10/14/76	07/17/89	06/12/72	12/18/89	09/04/92	78/1/2/10	03/22/80	09/04/92	09/10/84	05/31/88	11/14/79	04/20/87	05/31/88	05/16/94	09/25/89	09/02/89	10/15/93	03/21/94	03/27/89	44.800.70	01/10/83	06/04/90	04/14/80	10/14/85	10/26/90	04/23/93	05/17/82	09/04/92 01/17/95	
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PSTA Accident Tracking January 1996 to December 1996

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PSTA Accident Tracking January 1998 to December 1996

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Appendix C

Raw Frequency Table

VER TYPE	Total Of ID
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Dodge	1
Gillio	81
GMC	45
Orior	1.2
Fort	1
Internationa	1
GMC (Van	
Jeer	00.000000000000000000000000000000000000
New Flyer	00. 00000000000000000000000000000000000

Appendix D

Example of Accident/Incident Report Forms Tri-Met - Portland, OR

Supervisor Accident/Incident Report

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STATE FO MOTORCYCLE CT STATE FO _ Z YEST STATE STATE LOCATION OF PASSENGER CI FRT CI CTR CI REAR LOCATION OF PASSENGER OF RT CICTR CIREAR NEAREST CITY NO. OF PASSENGERS CITATION CITY PHONE PHONE 3 OTHER VEHICLE #2 CI MULTIPLE VEHICLE (SEE ADDITIONAL FORM) LICENSE NO. a čI PHONE D.O.B. 0.0.8 귾 EI. POLICY NUMBER REMOVED BY REMOVED BY REMOVED BY STATE Ь CLAIM NO: 30 **~** □ COLOR ωC INDICATE LOCATION OF DAMAGE OR POINT OF IMPACT: ZC MM YEAR MILES INJURIES VEHICLE# AT CI NEAR CI b▲d DRIVER (LAST, FIRST, M.L.) VEHICLE # NAME (LAST, FIRST, M.I.) DAMAGE DESCRIPTION DRIVER'S LICENSE NO. INSURANCE COMPANY REGISTERED OWNER OWNER'S ADDRESS FHICLE MAKE MILE POST ADDRESS TAKEN TO INJURIES TAKEN TO ADDRESS TAKEN TO D ADDRESS INJURIES INJURIES YESCI YES CI YESCI YES CI DISP. INC. NO: VALID DRIVER'S LICENSE CITATION NO. OF PASS: ASSAULT STATE STATE STATE STATE STATE STATE STATE TESTED D a LOCATION Š. D PHONE PHONE PHONE PHONE PHONE PHONE PHONE 8 등다 8 PM C È CH. È È CΙΙ ĕ CIT. 凹凹 REMOVED BY INDICATE LOCATION OF DAMAGE, POINT OF IMPACT OR FALL TYPE 1 SUPERVISOR: TRI-MET VEHICLE #1 VEHICLE NO. OPERATOR (LAST, FIRST, M.I.) 2 WITNESSES DAMAGE DESCRIPTION DATE OF ACCIDENT M D LINE/TRAIN TAKEN TO ADDRESS ADDRESS ADDRESS ADDRESS ADDRESS INJUNES ADDRESS ADDRESS NAME NAME NAME NAME NAME NAME

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Supervisor Accident/Incident Report Supplemental Form

SUPERVISOR:

OPERATOR

DATE OF ACCIDENT

OTHER VEHICLE #3 DRIVER (LAST, FIRST, M.I.)

DISP. INC. NO: -

55 BTATE STATE NO. OF PASSENGERS CITATION LIC. NO. ய் 0.0 B.0.0 LICENSE NO. PHOME ੂ 7 POLICY NUMBER REMOVED BY STATE CLAIM NO: VEHICLE NO. COLOR INDICATE LOCATION OF DAMAGE OR POINT OF IMPACT: YEAR LINETRAIN 4 OTHER VEHICLE #4 DRIVER (LAST, FIRST, M.I.) DRIVER'S LICENSE NO. DAMAGE DESCRIPTION HISURANCE COMPANY REGISTERED OWNER OWNER'S ADDRESS VEHICLE MAKE ADORESS TAKEN TO INUURIES ₹. 55 STATE STATE NO. OF PASSENGERS CITATION 0.0 B

LICENSE NO.

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Supervisor Accident/Incident Report Supplemental Form

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Vehicle Involved Vehicle #2		Address			City, State, Zi				e phone		
ehicle In Vehicle #2	Plate No.	State	Make	-	Model / type	Model / type Year			Color		
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Other	Registered Owner's	Name						Work	Phone		
Ü		Address			City, State, Zij	ρ		phone ·			
	Passenger Action	Passenç Locatio	ger on	Incident Type		er Passen Factors	ger	Floor / Condit	Step tion		
Passenger Accident (If applicable)	☐ Intending ☐ Boarding ☐ Deboarding ☐ Departing ☐ Standing ☐ Moving ☐ Sitting ☐ Mobility Aid ☐ Other	☐ On coach ☐ At door ☐ Front ☐ Center ☐ Rear ☐ Secureme ☐ On lift ☐ Off coach ☐ Other	ent Area	Fall on boar Bump on bo Hit by door Fall / stepwe Fall away fro Struck by ve Struck by bi Fall - lift rela Other	oard □ Car □ Ablell □ Unsign bus □ Usign bricke □ Cru cycle □ Imp	aring glass rying object e bodied / stable ng cane tches / Wa pairment (de	cts stable	☐ Dry ☐ Debris / ☐ Wet ☐ Snow / I ☐ Unknow Shoe Heel ☐ High	ce n Type: □ Low		
Pa		s steps from curb on and action:			☐ Mot	eelchair torized Who oter	eelchair	☐ Clamp ☐ Straps ☐ None			

	Ped. / Cyclist (If applicable)	Movemen Walking in Running in Standing ir Riding bicy Working in Playing in Unknown Other	street				Further Description ☐ At intersection ☐ In crosswalk ☐ Not in crosswalk ☐ No crosswalk ☐ With signal ☐ With stop sign/other ☐ Against sign/signal ☐ No sign/signal ☐ Other ☐ Other ☐ Other							
	Vehicle Actions e, passenger, and pedestrian accidents	Mark all boxes t (You are veh	incident of		on at time incident #2 #3		Distance between coach and other vehicle when hazard first recognized: ft.							
		Sudden stop Slowing / braki	0 0			0	Did you sound horn? If yes, how far away?				□ Ye	s □ No ft.		
		Stopped Stopped in zor Parked		000			☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐					□ Y	es □ No ft.	
		Backing Starting Passing Changing lanes							After impact coach moved ft. After impact other vehicle moved ft. Posted speed mph					ft.
		Going straight Turning left Turning right Entering zone				0000	0000					X" mark th injured pe	re point of contac rsons.	t and/or
	Vehicle Act	Leaving zone Pull from curb (non-zone Pull from driveway Other (explain)				0000								
	Il out for a	Left turn signal Right turn signal 4-way flashers												
	Ϊ	Your speed Other vehicle speed		mph mpl			-			Ш				
		☐ Passenger in Vehicle # ☐ Pedestrian	N	ame						Address			City, State, Zip	
		Other	·	escribe Injury				,		Sex:	F	Date of birth	Work Phone	Home Phone
Ì	lved	☐ Passenger in Vehicle # ☐ Pedestrian	Name					Address			City, State, Zip			
	Invo	□ Other ————		Describe Injury				Sex: Date of birth Work Phone H					Horne Phone	
1	red	□ Passenger in Vehicle # □ Pedestrian		Name					Address City, State , Zip					
l	inj.	Other		escribe Injury				Sex: Date of birth			Date of birth	Wark Phone	Home Phone	
	Persons Injured/Involved	☐ Passenger in Vehicle # Pedestrian	Name Describe Injury						Address			City, State , Zip		
		Other								Sex:	F	Date of birth	Work Phone	Home Phone
	I	☐ Passenger in Vehicle # ☐ Pedestrian		ame						Address	· ,		City, State , Zip	
		Other	De	escribe Injury						Sex:	F	Date of birth	Work Phone	Home Phone

																
i	☐ Passenger in Vehicle #			Name	-				Addres	:SS						
ł	Pedestrian			City, State , Zip					Han	-4-01		*****				
ļ	U Other		٠.,	y, State, L.					Home	ne phone	9	Work	rk phone			
Ì	☐ Passenger in			Name		$\overline{}$			Addres	220						
ł	Vehicle # □ Pedestrian		-	: 			_			~ .						
	Other		Cif	ity, State , Zip		· · · · · · · · · · · · · · · · · · ·	<u></u>		Home	ne phone	e	Work	rk phone			
δί													·			
Witnesses	☐ Passenger in Vehicle #			Name	_		_		Addres	ss						
9	Pedestrian —			ity, State , Zip					Hom							
巨色	Li Ouiei		-	/, State ,					nome	e phone		Work	phone			
>	☐ Passengerin			Name					Addres	22						
ł	Vehicle # ☐ Pedestrian								-	•		Work phone Home phone Color r \$400? # Pass.				
1	Other		Cit	ity, State , Zip					Home	e phone	a	Work	phone			
l										-						
1	☐ Passengerin Vehicle#	_		Name					Addres	is						
l	☐ Pedestrian —		City	ity, State , Zip					*******							
i .	Other		~··•	/, State , Lip					Home	e phone	_	Work p	phone			
	Driver's Name					Dr	river's License I	Number	Expir	ration Da	2-12	Sta				
1-				_ 		_	76. 5.	Various.		IIv.	ite	-	e			
ĕ	Sex:	D./	D.O.B.	Insu	urance Co.	 ,		Policy No.		\neg	Wor	rk phone	3			
र्न		2446									í					
Se 3		Addres	.ss		T	-	City, State,	, Zip		_	Home phone					
le #	Plate No.		State	Make	1	r	Model / type		Year							
Vehicle Inv Vehicle #3			State		J	í	Mountain,		Year		-	ior				
Other Vehicle Involved Vehicle #3 (If applicable)	Describe damage					****					Over \$400?		# Pass.			
, _ ,				-					-]Yes ☐ No					
je j	Registered Owner's	s Name									Wo	ork Phone	ie			
ō		Address					State									
1 1		Free	iS				City, State,	Zip			non	ne phone	e			
		* * ** ***														
ı [Name of suspe	∌ct(s) (īt knov	wn)										·			
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	Clothing or oth	ner characte	eristics:			-			-			_				
Theft / Assault / Arrest	Suspect De		on —	Weap	pons			Type	e of Inc	- cid	ont					
È		•	ָרָי בּי	1 None	·01] Theft				en. ndalism					
4	☐ Group (Coun	1t)	<u> </u>	☐ None ☐ Handgun ☐ Shotaun / Ri		[□ Transf		1	□ S	Seats					
=	☐ Male ☐ Female	•				E	□ Opera	ator's prope	erty !		Vindows					
an	☐ Female ☐ Adult			3 Assault wear 3 Knife	.pon	[☐ Passe	enger prope	ertv I		Doors					
ŠŠ	☐ Youth			J Knite J Hands / Feet	~ +	-	LI Uuro.	r	'		Coach interi Coach exter					
Ϋ́	☐ White			Club / Baton] Assault		ĭ	110	Coach exter Other	ЛОI —				
- 1	☐ Black] Unknown			□ Opera	ator			[[]E					
He	☐ Hispanic			Other		[☐ Passer	enger		-						
ا ځ	☐ Asian☐ Native Americ	•				L	☐ Other	r <u> </u>		,						
_	☐ Unknown			-		•	* -tion	T-bon /	*inc	٠, ٥						
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İ	☐ Other		-			T Arre	rested	□ Cite	-							
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Incident DateOperator	<i>ID#</i>	Veh. #	Line	Train
Diagram of Inc	cident			
Indicate North (use Arrow)		Label streets a	and number Met	each vehicle Other
		Use do mark lan	se arrow to show path otted line to es of travel destrian by d tracks by	→ ⊗ ++++
Describe what Happened (include events/actions prior to, du	uring, and	after incident)		
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Operator's Signature		Date of Report_		
Accepted by		Date Accepted		

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